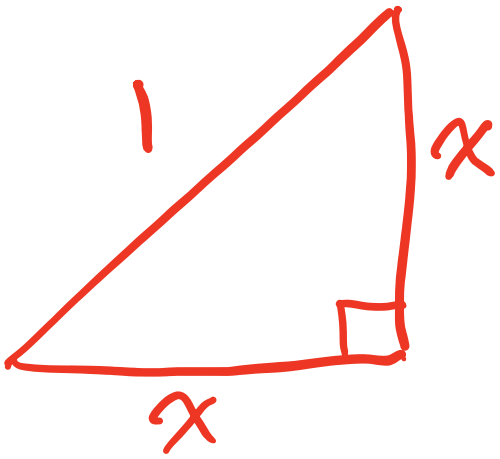
Name: Answer Key Date: 2025 Feb

u13 A Story of Special Right Triangles

1. The first special right triangle has a hypotenuse of length 1 and is isosceles. Draw a diagram, and label the sides, using a variable for the non-obvious lengths.



2. How large are the angles, from least to greatest, in the triangle you drew above? Answer in both degrees and radians.

$45°, 45°, 90°$

$\frac{\pi}{4}, \frac{\pi}{4}, \frac{\pi}{2}$

3. Use the Pythagorean Theorem to find the unknown lengths. Please answer in exact (and simplified) form.

$x^2 + x^2 = 1$

$2x^2 = 1$

$x^2 = \frac{1}{2}$

$x = \sqrt{\frac{1}{2}}$

$x = \frac{\sqrt{1}}{\sqrt{2}}$

$x = \frac{1}{\sqrt{2}}$

Need to rationalize
The denominator.

$x = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}}$

$\boxed{x = \frac{\sqrt{2}}{2}}$

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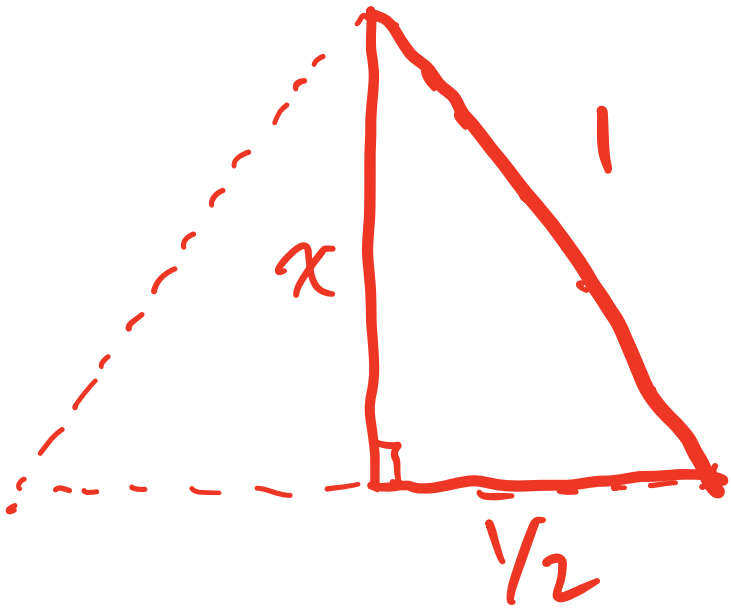
4. The second special right triangle is formed by splitting an equilaterial triangle in half. The right triangle should have a hypotenuse of length 1. Draw the equilateral triangle with dashed lines; draw the right triangle with solid lines; label the side lengths of the right triangle, using a variable for the non-obvious length.



5. How large are the angles, from least to greatest, of the right triangle? Answer in both degrees and radians.

$30^\circ, 60^\circ, 90^\circ$ $\quad \frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{2}$

6. Use the Pythagorean Theorem to find the length of the unknown side. Please answer in exact (and simplified) form.

$$x^2 + \left(\frac{1}{2}\right)^2 = 1^2$$
$$x^2 + \frac{1}{4} = 1$$
$$x^2 = 1 - \frac{1}{4}$$
$$x^2 = \frac{4}{4} - \frac{1}{4}$$
$$x^2 = \frac{3}{4}$$
$$x = \sqrt{\frac{3}{4}}$$
$$x = \frac{\sqrt{3}}{\sqrt{4}}$$
$$\boxed{x = \frac{\sqrt{3}}{2}}$$